REMARKS/ARGUMENTS

Claims 12-15 and 17-22 are pending in the Application. Claim 16 is canceled. Claim 12 has been amended to incorporate all the limitations of canceled Claim 16. Claim 15 has been amended to recite that the amount of olefin intermediately fed in each case is controlled "by individual pumps, valves, nozzles, diaphragms or orfices." Support for the language added to Claim 15 is found in the Specification at page 4, line 9-11. Claim 22 has been redrawn in independent form to specify and incorporate the process limitations of currently amended Claim 12 to further define stage "c) reacting the C_{10-12}-olefin mixtures obtained in stage b) with an aromatic hydrocarbon in the presence of an alkylation catalyst to form alkylaromatic compounds, where, prior to the reaction, 0 to 60% by weight, based on the C_{10-12}-olefin mixtures obtained in stage b), of linear olefins may additionally be added".

No new matter has been added.

Rejection of Claim 15 and 22 under 35 U.S.C. 112, 2nd ¶

Claim 15 stands rejected under 35 U.S.C. 112, 2nd ¶, because the Examiner concludes that "it is unclear how the amounts of olefin fed to the stages are controlled so that the same incremental productivity is achieved, based on the respective amount of catalyst" (Office Action dated March 2, 2009 (OA), page 2). The Specification teaches that the amounts of olefin fed to the stages are controlled in a conventional manner using individual pumps, valves, nozzles, diaphragms, and orfices (Spec., p. 4, ll. 9-11). The controls are now expressly recited in Claim 15. On the other hand, if the Examiner is questioning how persons having ordinary skill in the art would have determined the adjustments necessary to achieve the same incremental productivity, based on the respective amount of catalyst, the Examiner will recall that claims are to be read in a manner consistent with the supporting Specification. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316 (Fed. Cir. 2005)(en banc). The scope and content of the claims are always determined in light of the supporting Specification. *In re*

Zletz, 893 F.2d 319, 321 (Fed. Cir. 1989). At page 4, line 23, to page 5, line 2, Applicant's Specification instructs persons having ordinary skill in the art that the amount of olefins fed at each stage of the reaction must be practically controlled. The amount of olefin fed is matched to the amount of active catalyst remaining at each reaction stage and is "adjusted so that, in each reactor, the same increase in conversion product is achieved, based on the respective amount of catalyst" (Spec., p. 4, ll. 36-39). The Specification teaches (Spec., p. 4, l. 39, to p. 5, l. 2), "Expressed another way, based on the respective amount of catalyst, the product yield is increased uniformly in each reactor such that the same number of conversions take place over the respective catalyst per unit of time."

35 U.S.C. 112, 2nd ¶, provides, "The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention." When read in light of Applicant's supporting specification, the currently amended claims reasonably apprise those skilled in the art of their scope. Accordingly, the second paragraph of 35 U.S.C. § 112 is satisfied. *Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1385 (Fed. Cir. 1986). Stated another way, the law requires no more than reasonable precision in delineating the scope of the claimed invention. *Id.*

Claim 22 stands rejected under 35 U.S.C. 112, 2nd ¶, as vague and indefinite because the Examiner concludes that Claim 22 is drawn to a process for preparing alkylarylsulfonates which depends on the process of Claim 12 for making alkylaromatic compounds. The Examiner should note that it is only the intermediate stage c) of the Claim 22 process which is performed by the process of Claim 12. Nevertheless, for absolute clarity, Claim 22 has been amended to expressly state "wherein the reaction in stage c) is carried out" in accordance with the process limitation language defining Claim 12 which has been

incorporated into Claim 22. There now should be no lack of clarity whatsoever. Accordingly, the rejections under 35 U.S.C. 112, 2nd ¶, should be withdrawn.

Rejections of Claims 12-14, and 17-19 under 35 U.S.C. 102

Claims 12-14 and 17 stand rejected under 35 U.S.C. 102(b) as anticipated by Williamson (U.S. Patent 3,207,800, issued September 21, 1965)(OA, p. 2). Claims 12-14, 18, and 19 stand rejected under 35 U.S.C. 102(b) as anticipated by Lee (U.S. Patent 5,198,595, issued March 30, 1993)(OA, p. 3). Both rejections should be withdrawn in view of Applicant's current amendments to independent Claim 12.

The Examiner did not find that the method defined by previously presented Claim 16 is anticipated by either Williamson or Lee. The Examiner found that neither Williamson nor Lee "discloses . . . changing the order of the reactors as . . . in [claim] 16" (OA, pp. 4 and 5). Currently amended Claim 12 now incorporates all the limitations of previously presented Claim 16. Accordingly, all the Examiner's prior rejections under 35 U.S.C. 102(b) over Williamson and Lee are moot and should be withdrawn. None of the cited references describes a process for the preparation of alkylaromatic compounds in which the order of the reactors used to produce the alkylaromatic compounds within the reactor cascade is "changed at time intervals such that each reactor assumes each of the positions within the cascade for the same period of time."

Rejections of Claims 15, 16, 18, and 20 under 35 U.S.C. 103 in view of Williamson

Claims 15, 16, 18, and 20 were rejected under 35 U.S.C. 103 in view of Williamson. The rejection should be withdrawn.

The Examiner finds (OA, p. 4):

> W does not discloses [sic] (1) controlling the amount of olefin being fed to each stages [sic] to achieve the same incremental productivity as . . . in claim 15, (2) changing the order of the reactors as . . . in [claim] 16, (3) operating the process at a temperature in the range from 100 to 250°C as . . . in claim 18, and (4) the branching degree of the olefins [as in claim 20].

The Examiner nevertheless finds that the amounts of olefin and catalyst at each stage of the reaction are variables which effect the product produced by W's process, the product selectivity of the product produced by W's process, and the productivity of W's process. The Examiner finds that each result effective variable would have been obvious to a person having ordinary skill in the art because each is well within the ordinary skill in the art to optimize without undue experimentation (OA, p. 4).

The Examiner also concludes that it would have been obvious to a person having ordinary skill in the art to change the order of the reactors because reactors placed in any order would reasonably be expected to yield similar results (OA, p. 4, last ¶).

The Examiner additionally concludes without evidentiary support that persons having ordinary skill in the art would have expected similar results running alkylation reactions generally at higher temperatures (OA, p. 5, ¶ 1).

Finally, the Examiner suggests that persons having ordinary skill in the art would vary the degree of branching of the olefin reactants depending on the degree of branching desired in the product (OA, p. 5, ¶ 2).

None of the Examiner's findings, conclusions, and suggestions are based on any teachings, instruction, or guidance in the cited prior art. The basis for the Examiner's conclusion that it would have been obvious to a person having ordinary skill in the art to change the order of the reactors, a limitation in each and every process Applicant currently claims, is not found in the applied prior art. Yes, Williamson utilizes multiple reactors, but the multiple reactors are used to perform distinct stages of the disclosed reaction process. Each of the multiple stages of the disclosed reaction process is distinct from at least one other in that the reactant proportions therein differ significantly. Williamson states (Williamson, col. 3, ll. 41-42), "In order to obtain optimum results, at least three stages are to be used." "[S]ubstantially all of the aromatic compound . . . is introduced into the first stage or reaction

zone. . . . The balance, if any, can be introduced in the second and third stages in varying or equal quantities" (Williamson, col. 3, ll. 51-57). Williamson's process requires that "the bulk of the [aromatic compound] . . . fed to the reaction system in accordance with this invention passes serially through the total of the stages employed" (Williamson, col. 3, ll. 59-62).

With regard to feeding olefin, Williamson teaches (Williamson, col. 3, ll. 65-73; emphasis added):

> The total amount of olefin introduced into the system can be divided up so that an equal amount is added to each stage. However, this suggested mode of uniform addition can be varied somewhat. For example, when employing the preferred system of three alkylation stages, 30-50% of the olefin feed can be charged to the first stage and from about 25-35% thereof to each of the other two stages.

However, Williamson expressly states (Williamson, col. 4, ll. 35-45):

> [T]he internal molar ratio of the . . . [aromatic compound] to olefin is considerably higher in each stage, particularly the initial stages, than the cumulative ratio selected for the overall process. For example, in the operation of a multi-stage process . . . the external molar ratio of the reactants will be 30 for the first stage and 15 cumulative for the first two stages . . . .

Williamson's processes cannot be readily modified to change the order of the multi-stage reactors at time intervals such that each reactor assumes each of the positions within the cascade for the same period of time once substantially all of the aromatic compound is added to the first reactor. Moreover, Williamson's intentions to have "the bulk of the [aromatic compound] . . . fed to the reaction system pass serially through the total of the stages employed (Williamson, col. 3, ll. 59-62) and maintain a higher internal molar ratio of aromatic compound to olefin in the initial stages of the process cannot be satisfied by changing the order of the multi-stage reactors at time intervals such that each reactor assumes each of the positions for the same period of time.

Moreover, Applicant's examples and comparative examples on pages 12-16 of the Specification and the results in the Tables on pages 15 and 16 of the Specification show that the service lifetime of the catalysts in Applicant's claimed process wherein the order of the

multi-stage reactors changes at time intervals such that each reactor assumes each of the positions for the same period of time as compared to a process which does not change the initial reactor is unexpectedly improved from about 163 hours to about 199 hours. Applicant's Specification also reports an increase in its process selectivity with regard to dodecene by about 2 percentage points (Spec., p. 16, Result). Accordingly, there is no basis whatsoever in Williamson for persons having ordinary skill in the art to reasonably expect, as the Examiner concludes, that it would have been obvious to persons having ordinary skill in the art to change the order of reactors and reasonably expect similar results (OA, p. 4, last ¶). And, the comparative evidence in Applicant's Specification further refutes that general conclusion.

With regard to the reaction temperature limitations of Claim 18, the is no basis in Williamson for reaction temperatures from 100 to 250°C. Williamson prefers reaction temperatures from 60-150°F (Williamson, col. 4, ll. 1-2). Moreover, hindsight alone would have led persons having ordinary skill in the art to the limitations of current Claims 15 and 20. There is no teaching in Williamson at all to control the intermediate olefin feed in each of the reactors to achieve the same incremental productivity in each reactor or control the degree of branching of the olefin and no reasonable suggestion to do so anywhere except in Applicant's Specification.

Accordingly, the Examiner's rejections under 35 U.S.C. 103 in view of Williamson's teaching should be withdrawn.

Rejections of Claims 15, 16, 17, and 20

Claims 15, 16, 17, and 20 were rejected under 35 U.S.C. 103 over Lee. The Examiner's findings with regard to Lee's deficiencies are substantially identical to the findings regarding the deficiencies of Williamson's disclosure. The Examiner similarly finds that the amounts of olefin and catalyst at each stage of the reaction are variables which effect

the product produced by Lee's process, the product selectivity of the product produced by Lees's process, and the productivity of Lee's process (OA, p. 5). The Examiner again finds that each result effective variable would have been obvious to a person having ordinary skill in the art because each is well within the ordinary skill in the art to optimize without undue experimentation (OA, p. 4).

The Examiner again concludes that it would have been obvious to a person having ordinary skill in the art to change the order of the reactors because reactors placed in any order would reasonably be expected to yield similar results (OA, p. 5, last ¶)..

The Examiner again suggests that persons having ordinary skill in the art would vary the degree of branching of the olefin reactants depending on the degree of branching desired in the product (OA, p. 6, ¶ 2).

The Examiner also argues that it would have been obvious to persons having ordinary skill in the art to replace each stage of Lee's process with stirred-tank reactors (OA, p. 6, 1st ¶).

Lee teaches persons having ordinary skill in the art that "decreasing the molar ratio of [aromatic compound] to alkylating agent" in the multiple stage reaction system is necessary to minimize the expense of recycling the aromatic compound (Lee, col. 1, l. 65, to col. 2, l. 16). Lee teaches (Lee, col. 12, ll. 10-17; emphasis added):

> In the continuous process of the present invention, preferably, a plurality of catalyst containing reaction zones in fluid connection in series is used, wherein the whole of the benzene or substituted benzene is delivered to a first reaction zone, and a series of fractions of alkylating agent are delivered respectively to the first reaction zone and between each pair of contiguous reaction zones.

Thus, like Williamson's process, Lee's multi-zone process cannot be readily modified to change the order of the multi-zones at time intervals such that each zone assumes each of the positions within the cascade for the same period of time after all the aromatic compound is added to the first reactor. Lee intends to have "the whole of the benzene or substituted

benzene . . . delivered to a first reaction zone" (Lee, col. 12, ll. 13-15) and to maintain a higher internal molar ratio of aromatic compound to alkylating agent in the initial stages of the process. Lee's purposes cannot be satisfied by changing the order of each of the multi-zone reaction zones at time intervals such that each zone assumes each of the zone positions for the same period of time.

Again, Applicant's examples and comparative examples on pages 12-16 of the Specification and the results in the Tables on pages 15 and 16 of the Specification show that the service lifetime of the catalysts in Applicant's claimed process wherein the order of the multi-stage reactors changes at time intervals such that each reactor assumes each of the positions for the same period of time as compared to a process which does not change the initial reactor is unexpectedly improved from about 163 hours to about 199 hours. Again, Applicant's Specification reports an increase in its process selectivity with regard to dodecene by about 2 percentage points (Spec., p. 16, Result). Again, there is no basis whatsoever in Lee for persons having ordinary skill in the art to reasonably expect, as the Examiner concludes, that it would have been obvious to one having ordinary skill in the art to change the order of reactors and reasonably expect similar results (OA, p. 4, last ¶). The comparative evidence in Applicant's Specification also refutes that conclusion.

Regarding the obviousness of using a stirred-tank reactor in each of Lee's reaction zones, the Examiner has not explained how this might be done. Lee states (Lee, col. 12, ll. 54-56), "The catalyst may be used in various forms, such as fixed bed, moving bed, or fluidized bed." These are not systems which reasonably would have led persons having ordinary skill in the art to use multiple stirred-tank reactors. Moreover, the Examiner has not explained how persons having ordinary skill in the art might reasonably expect to change the order of Lee's reaction zones using multiple fixed, moving, or fluidized catalyst beds at time intervals such that each zone assumes each of the positions within the multi-zone process for

the same period of time. The solution is especially perplexing when all of Lee's aromatic compound must be added to the first reaction zone.

The Examiner's rejections of Claims 15-17 and 20 under 35 U.S.C. 103 over Lee's disclosure should be withdrawn.

Rejections of Claims 21-22 under 35 U.S.C 103 over Williamson or Lee in view of Maas

Claims 21-22 stand rejected under 35 U.S.C. 103 over Williamson or Lee as applied to Claim 12, and further in view of Maas (WO 02/14266)(OA, p. 6). The rejection should be withdrawn for the reasons previously stated herein.

The Examiner does not argue or suggest that Maas remedies any of the deficiencies in Williamson or Lee regarding the alleged obviousness of the process of Applicant's Claim 12 to persons having ordinary skill in the art at the pertinent time. Moreover, the Examiner has not explained where, how, or why Maas reasonably suggests the materials, steps, and order of steps in the process of preparing alkylsulfonates specifically defined by Applicant's Claims 21 and 22, as is the PTO's burden. The burden of proof is on the PTO to establish the factual basis for its rejections under 35 U.S.C. 103. *In re Piasecki*, 745 F.2d 1468, 1472 (Fed. Cir. 1984). The Examiner invariably has the initial burden to establish a prima facie case of obviousness under 35 U.S.C. 103. *In re Fritch*, 972 F.2d 1260, 1265 (Fed. Cir. 1992); *In re Fine*, 837 F.2d 1071, 1074 (Fed. Cir. 1988). Here, the Examiner's case for obviousness for Applicant's process Claims 21-22 is remarkably deficient. The rejection should be withdrawn.

For the reasons stated herein, Applicant's currently amended Claims 12-15 and 17-22 are allowable over the cited prior art and in condition for allowance. Early notice of allowance is respectfully requested.

Respectfully submitted,

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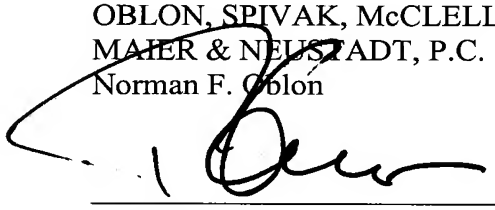

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